

# COPEPODA SIPHONOSTOMATOIDA ASSOCIATED WITH WEST INDIAN HERMATYPIC CORALS 1: ASSOCIATES OF SCLERACTINIA: FAVIINAE

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## ABSTRACT

The great majority of the Copepoda associated with hermatypic corals in the Indo-Pacific belong to the Lichomolgoidea and Xariffiidae. In the West Indies the associates belong almost entirely to the Asterocheridae and Corallovexiidae. Four genera of the scleractinian subfamily Faviinae occur in Curaçao. Species of each coral genus carry a specific copepod associate of the family Asterocheridae: four new species in four genera, of which two are new.

Until recently, it was believed that the turbulent Tertiary history of the West Indies had not only led to a decimation of the number of species of hermatypic corals, but also to the absence of copepod associates on these corals (Stock, 1975a).

Systematic studies carried out in 1973-1974, during a stay of the author at the Caribbean Marine Biological Institute, Curaçao, revealed the presence of an endemic Caribbean family of Copepoda, the Corallovexiidae (13 species in 2 genera), endoparasites of 12 different species of reef corals (Stock, 1975a; Butter, 1976; 1979; Herriot and Immermann, 1979). Another associate, belonging to the family Asterocheridae, was described from the coral *Montastraea* (= *Montastrea*) by Stock (1975b).

Quite a few other associated Copepoda remained unstudied and will be the subject of the present and future papers. The actual status is that associated Copepoda are known from many species of reef corals, mainly from Curaçao only, but that these species all belong to two groups, Corallovexiidae and Siphonostomatoida (chiefly Asterocheridae).

This contrasts sharply with the situation in the Indo-Pacific, where not only many more (a factor 10) hermatypic corals occur, but where the number of copepod associates is also much greater. These copepods, however, belong with very few exceptions to the Lichomolgoidea (Lichomolgidae, Pseudanthessiidae) and Xariffiidae (Humes, 1979; 1985). Both (super)families are not known to infest West Indian coral hosts. The reason for these taxonomic differences in the composition of the fauna of Copepoda associated with corals of the two regions remains obscure for the moment.

The present paper describes four new species in four genera of the family Asterocheridae; each species is specific for a genus of coral host of the subfamily Faviinae in Curaçao.

The nomenclature of the hosts follows in general Roos' (1971) treatment of the stony corals of the Netherlands Antilles.

All specimens are preserved in the Zoölogisch Museum, Amsterdam (ZMA).

## Family ASTEROCHERIDAE Giesbrecht, 1899

Diagnosis of the family: Cyclopiiform siphonostomatoid Copepoda, in which the mandible possesses a palp and/or in which the first antenna bears (at least) one aesthetasc on the penultimate or antepenultimate segment, but not on the terminal segment.

West Indian reef corals are frequently associated with siphonostomatoid co-

pepods of the Asterocheridae, which may be ectoassociated or endoparasitic. Since the number of genera in this family strongly increased during the last decades, it was thought useful to present here first a key to the genera.

**KEY TO THE GENERA OF THE FAMILY ASTEROCHERIDAE, BASED  
MAINLY ON FEMALE CHARACTERS<sup>1</sup>**

|                                                                                                                                                                                              |                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 1a. Two (♀) or three (♂) postgenital somites .....                                                                                                                                           | 2                                            |
| 1b. Three (♀) or four (♂) postgenital somites .....                                                                                                                                          | 23                                           |
| 2a. P4 strongly reduced to a 1-segmented vestige .....                                                                                                                                       | 3                                            |
| 2b. P4 with at least a multisegmented exopodite .....                                                                                                                                        | 5                                            |
| 3a. Exopodite of P1 to P3 2-segmented. .... <i>Cystomyzon</i> Stock, 1981                                                                                                                    |                                              |
| 3b. Exopodite of P1 to P3 3-segmented .....                                                                                                                                                  | 4                                            |
| 4a. Endopodite of P1 without medial setae. A1 with numerous aesthetascs. A2 virtually without exopodite .....                                                                                | <i>Cholomyzon</i> Stock and Humes, 1969      |
| 4b. Endopodite of P1 with 2 medial setae. A1 with 1 aesthetasc. A2 with well-developed exopodite .....                                                                                       | <i>Oedomyzon</i> Stock, 1981                 |
| 5a. P4 devoid of endopodite .....                                                                                                                                                            | 6                                            |
| 5b. P4 with endopodite .....                                                                                                                                                                 | 7                                            |
| 6a. Exopodite of P1 to P4 2-segmented .....                                                                                                                                                  | <i>Tuphacheres</i> Stock, 1965               |
| 6b. Exopodite of P1 to P4 3-segmented .....                                                                                                                                                  | <i>CletoPontius</i> Thompson and Scott, 1903 |
| 7a. Endopodite of P4 2-segmented .....                                                                                                                                                       | 8                                            |
| 7b. Endopodite of P4 3-segmented .....                                                                                                                                                       | 9                                            |
| 8a. Endopodite of P3 2-segmented. Second endopodite segment of P1 and P2 with 1 medial seta .....                                                                                            | <i>Peltomyzon</i> Stock, 1975                |
| 8b. Endopodite of P3 3-segmented. Second endopodite segment of P1 and P2 with 2 medial setae .....                                                                                           | <i>Discopontius</i> Nicholls, 1944           |
| 9a. Second endopodite segment of P1 to P4 with 2 medial setae .....                                                                                                                          | 15                                           |
| 9b. Second endopodite segment of one or more legs with less than 2 medial setae .....                                                                                                        | 10                                           |
| 10a. Second endopodite segment of P2 to P4 without medial setae .....                                                                                                                        | 14                                           |
| 10b. Second endopodite segment of P2 to P4 with medial setae .....                                                                                                                           | 11                                           |
| 11a. Exopodite of A2 as long as first endopodite segment. Third endopodite segment of P4 with 3 elements (lateral setae lacking, 0-1-2) .....                                                | <i>Caecidomyzon</i> Stock, 1981              |
| 11b. Exopodite of A2 very small, much shorter than first endopodite segment. Third endopodite segment of P4 with 4 or 5 elements (lateral seta present) .....                                | 12                                           |
| 12a. Mandible without palp. Coxopodite of P2 to P4 with strong, plumose medial seta. Exopodite segment 3 of P1 with 3 lateral spines (III-4) .....                                           | <i>Scottocheres</i> Giesbrecht, 1897         |
| 12b. Mandible with palp. Medial coxopodite seta lacking in P2 to P4. Exopodite segment 3 of P1 with 2 lateral spines (II-4) .....                                                            | 13                                           |
| 13a. Aesthetasc on distal segment of A1♀. Distal endopodite segment + claw of A2 < endopodite segment 1. Endopodite segment 2 of P4 with 2 medial setae .....                                | <i>Onychocheres</i> Stock and Gooding, 1986  |
| 13b. Aesthetasc on (ante)penultimate segment of A1♀. Distal endopodite segment + claw of A2 > endopodite segment 1. Endopodite segment 2 of P4 with 1 medial seta .....                      | <i>Hermacheres</i> new genus                 |
| 14a. Second endopodite segment of P1 without medial seta. First exopodite segment of P1 without medial seta. Third endopodite segment of P4 unarmed .....                                    | <i>Psilomyzon</i> Stock, 1965                |
| 14b. Second endopodite segment of P1 with 1 medial seta. First exopodite segment of P1 with 1 medial seta. Third endopodite segment of P4 with 2 setae ... <i>Indomyzon</i> Ummerkutty, 1966 |                                              |
| 15a. Third endopodite segment of P4 with armature I-2 (lateral armature absent) .....                                                                                                        | 16                                           |
| 15b. Third endopodite segment of P4 with lateral armature (1-I-2 or 1-1+I-2) .....                                                                                                           | 17                                           |
| 16a. First antenna 19-segmented. Exopodite of A2 with 3 short setae .....                                                                                                                    | <i>Scottomyzon</i> Giesbrecht, 1897          |
| 16b. First antenna 8- to 10-segmented. Exopodite of A2 with 1 very long seta .....                                                                                                           | <i>Hammatomyzon</i> Stock, 1981              |
| 17a. Third endopodite segment of P4 with 4 elements (1-1-2) .....                                                                                                                            | 18                                           |
| 17b. Third endopodite segment of P4 with 5 elements (1-1+I-2) .....                                                                                                                          | 20                                           |

<sup>1</sup> Not included in the key are: *Doropontius* Thompson and Scott, 1903, of which P2 to P4 are unknown; *Thoostoma* Wilson, 1924 (= *Conostoma* Thomson, 1883, preocc.), which appears to belong to the family Nanaspidae, although the long siphon is a disconcerting character), and *Danodes* Wilson, 1942, to which a mandible palp is attributed, but which is otherwise referable to the Pontocciellidae.

- 18a. Exopodite of A2  $\geq$  first endopodite segment ..... *Acontiphorus* Brady, 1880  
 18b. Exopodite of A2  $\leq$  first endopodite segment ..... 19  
 19a. P5 very small (not reaching  $\varnothing$  genital aperture). Caudal ramus very elongate ( $5\times$  as long as anal segment). A1 $\varnothing$  with 3 segments distad of aesthetask ..... *Mesocheres* Norman and Scott, 1905  
 19b. P5 reaching  $\varnothing$  genital aperture. Caudal ramus  $\leq$  anal segment. A1 $\varnothing$  with 1 segment distad of aesthetask ..... *Asteropontoides* Stock, 1975  
 20a. P5 without free segment ..... *Monocheres* Stock, 1966  
 20b. P5 with free segment ..... 21  
 21a. A2 with 3 distal elements on endopodite, the longest of which is more or less setiform. Mandible palp long, 1- or 2-segmented, with at least 2 longer setae ..... *Asterocheres* Boeck, 1859  
 21b. A2 with 2 distal elements on endopodite, the longest of which is claw-like. Mandible palp short, 1-segmented, with only 1 longer seta ..... 22  
 22a. First exopodite segment of P1 with medial seta (I-1). Third exopodite segment of P4 with 3 lateral spines (III-I-4) ..... *Asteropontius* Thompson and Scott, 1903  
 22b. First exopodite segment of P1 without medial seta (I-0). Third exopodite segment of P4 with 2 lateral spines (II-I-4) ..... *Asteropontopsis* new genus  
 23a. P4 without endopodite ..... *Cletopontius* Thompson and Scott, 1903  
 23b. P4 with endopodite ..... 24  
 24a. Fifth leg 1-segmented. Exopodite A2 2-segmented. Outer lobe of maxilla 1 very small ..... *Australomyzon* Nicholls, 1944  
 24b. Fifth leg 2-segmented. Exopodite of A2 1-segmented. Outer lobe of maxilla 1 well-developed ..... 25  
 25a. Rostrum large, prominent, downcurved, beak-like ..... *Rhynchomyzon* Giesbrecht, 1895  
 25b. Rostrum small, less prominent ..... 26  
 26a. Outer lobe of maxilla 1 with 1 heavy seta. Third exopodite segment of P4 with 3 medial setae (III-I-3) ..... 27  
 26b. Outer lobe of maxilla 1 with 4 "normal" setae. Third exopodite segment of P4 with 4 medial setae (III-I-4) ..... *Dermatomyzon* Claus, 1889  
 27a. Exopodite of A2 1-segmented. Third exopodite segment of P1 armed III-2-3. Second segment of P5 linear in shape ..... *Collocheres* Canu, 1893  
 27b. Exopodite of A2 reduced to a setule. Third exopodite segment of P1 armed II-2-2. Second segment of P5 ovate ..... *Collocherides* Stock, 1971

## SYSTEMATIC DESCRIPTIONS

### *Asterocheres maxillatus* new species

Material. — 1  $\varnothing$  (holotype), 1  $\varnothing$  (paratype). From *Manicina areolata* (L.) f. *mayori*. Curaçao, reefs ca. 500 m W of Picadera Bay, depth ca. 4 m, 7 Jan. 1974. (ZMA Co. 102.745).

**Female.** — Holotype, length 558  $\mu\text{m}$ , greatest width of cephalosome 426  $\mu\text{m}$ ; paratype 565  $\times$  428  $\mu\text{m}$ . Cephalosome and metasomites 1+2 forming a rounded shield (Fig. 1a), dorsally covering metasomite 3, urosomite 1, and the anterior half of urosomite 2 (=genital segment). Genital segment (Fig. 1b) wider than long; lateral margins not ciliated; genital apertures marked by a spine and a seta (=rudiments of leg 6). Two postgenital segments, first unadorned, second (=anal) with posterior row of fine denticles. Furcal ramus (Fig. 1b) 27  $\times$  19.5  $\mu\text{m}$ ; armed with 4 distal, plumose setae, central two of which very long, one dorsomedial and one dorsolateral seta, both smooth.

Proboscis (Fig. 1c) nearly regularly tapering, reaching to base of maxillipeds.

First antenna (Fig. 1d) 20-segmented; segments 1, 6, 7, 10, 13, 16, and 17 apparently with 1 seta only; segment 9 with 6 setae; segment 18 with 1 seta and 1 long aesthetask; segment 20 with 7 setae; remaining segments with 2 elements.

Second antenna (Fig. 1e): Coxopodite as long as wide. Basipodite slender, unarmed. Exopodite small, with 2 distal setae. Endopodite segment 1 laterally with fine setules, segment 2 with 1 mediolateral spine, segment 3 with 1 long, thin claw and 2 shorter spinules.

Mandibular stylet (Fig. 2a) thin, needle-like; palp 2-segmented, distal armature of 1 long, plumose seta and 1 short plumose seta.

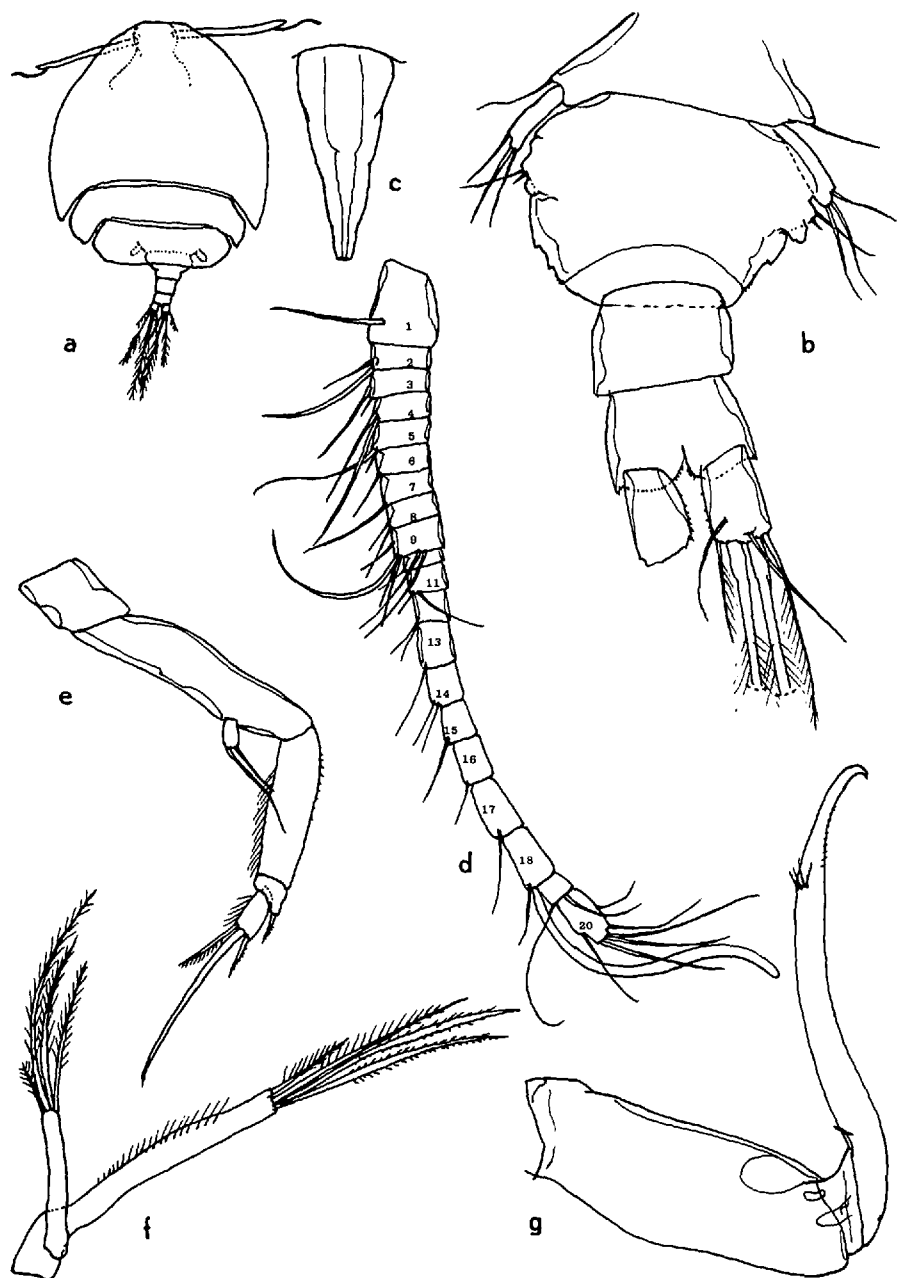


Figure 1. *Asterocheres maxillatus* new species, ♀: a, body, dorsal (scale AB); b, urosome, dorsal (AE); c, proboscis, ventral (AC); d, first antenna (AE); e, second antenna (AE); f, first maxilla (AE); g, second maxilla (AE). Scales on Figure 5.

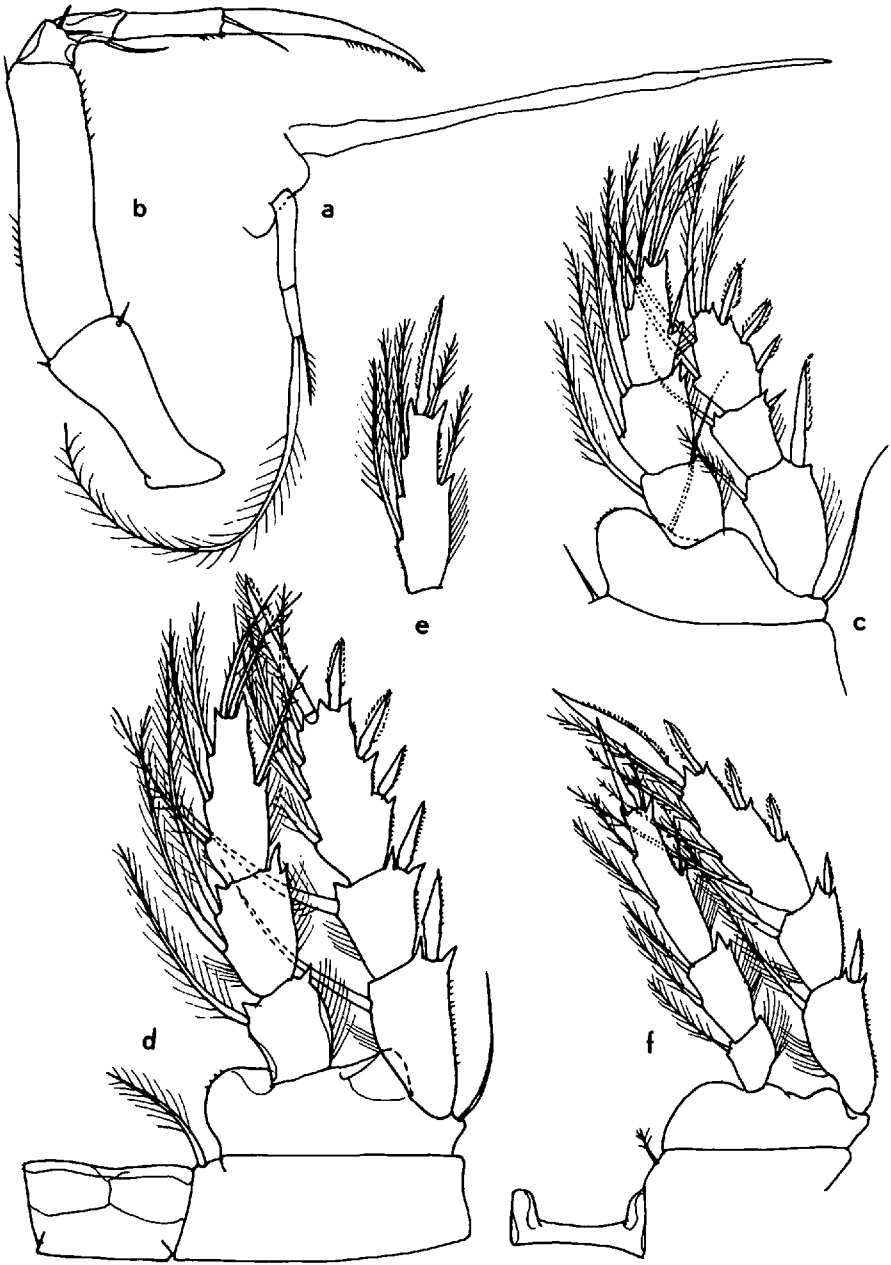


Figure 2. *Asterocheres maxillatus* new species, ♀: a, mandible; b, maxilliped; c, first leg; d, second leg; e, third endopodite segment of third leg; f, fourth leg. All scale AE. Scale on Figure 5.

First maxilla (Fig. 1f): Both lobes extremely slender and narrow; inner lobe almost twice as long as outer lobe; both lobes with 4 plumose setae.

Second maxilla (Fig. 1g): Basal segment relatively slender, unarmed. Second segment (=claw) curved, armed with proximal spinule and a group of setules at about  $\frac{2}{3}$  of length.

Maxilliped (Fig. 2b) slender; armature as illustrated.

First leg with long, thin seta on medial side of basipodite; segment 3 of exopodite, and in particular of endopodite, elongate. Chaetotaxis of legs 1 to 4 (Fig. 2c-f) as usual in the genus:

|    | coxopodite | basipodite | exopodite           | endopodite        |
|----|------------|------------|---------------------|-------------------|
| P1 | 0-1        | 1-1        | I-1; (I)-1; III-2-2 | 0-1; 0-2; 1-2-3   |
| P2 | 0-1        | 1-0        | I-1; I-1; III-1-4   | 0-1; 0-2; 1-2-3   |
| P3 | 0-1        | 1-0        | I-1; I-1; III-1-4   | 0-1; 0-2; 1-1+I-3 |
| P4 | 0(?) -1    | 1-0        | I-1; I-1; III-1-4   | 0-1; 0-2; 1-1+I-2 |

Leg 5 (Fig. 1b) 3 times as long as wide ( $187 \times 63 \mu\text{m}$ ), with 3 distal setae.

Live color orange.

*Male*. — Unknown.

*Etymology*. — The specific name, *maxillatus*, refers to the characteristic slenderness of the first maxilla.

*Remarks*. — The combination of a shield-shaped anterior part of the body (hiding the posterior metasomites in dorsal view) and the extremely slender and narrow lobes of the first maxilla characterize the new species against all other representatives of the genus *Asterocheres*.

A single specimen of this species was also encountered on the coral *Montastraea annularis* (Ellis and Solander), in the same locality as the type specimens. *Montastraea* belongs to the Montastracinae, the other subfamily of the Faviidae; whether the occurrence of *Asterocheres maxillatus* on *Montastraea* is accidental can only be decided when more material becomes available.

### *Asteropontius proximus* new species

*Material*. — 1 ♀ (holotype) and 17 ♀ (paratypes). Endoparasitic in *Colpophyllia natans* (Müller). Curaçao, Santa Marta Bay, in front of Coral Cliff Hotel, depth 5–6m, 16 Dec. 1973. (ZMA Co. 102.744).

*Female*. — Body length 0.82–0.88 mm; greatest width of cephalosome 0.41–0.43 mm. Body (Fig. 3b) rather slender. Urosome as illustrated (Fig. 3b); fine setules on lateral margins of posterior part of genital segment; scale-like denticles on lateral margins of post-genital and anal segments. Caudal ramus (Fig. 3b)  $30 \mu\text{m}$  long; greatest width near distal end,  $26 \mu\text{m}$ ; two central furcal setae very thick, with narrower basal stalk.

First antenna (Fig. 4a) 19-segmented; aesthetask on penultimate segment.

Second antenna (Fig. 4b): Exopodite very small, with 2 short setae. Claw long, narrow, slender, curved.

Proboscis (Fig. 3c) truncate-conical, reaching to insertion of maxillipeds.

Mandible (Fig. 3d) with 1-segmented palp, armed with 1 long and 1 minute seta. Stylet distally widened into a toothed blade.

First maxilla (Fig. 3e): Outer lobe more than half as long as inner lobe, distally with 1 longer and 1 shorter seta. Inner lobe wide, not very elongate, distally with 3 longer and 1 shorter setae.

Second maxilla (Fig. 3f) with long claw.

Maxilliped (Fig. 3g) slender; setae on claw short.

Biramous legs (Figs. 4c–d, 5a–b) conforming the shape and armature typical for the genus. First leg: exopodite segment 2 with short lateral spine; proximal spine of lateral margin of endopodite segment 3 short as well; medial coxopodite seta rudimentary.

Fifth leg (Fig. 3b)  $69 \times 32 \mu\text{m}$ ; rounded-rectangular, with 1 long and 1 short distal seta and a thin setule on medial margin, slightly beyond middle of segment.

Live color white with dark red eye.

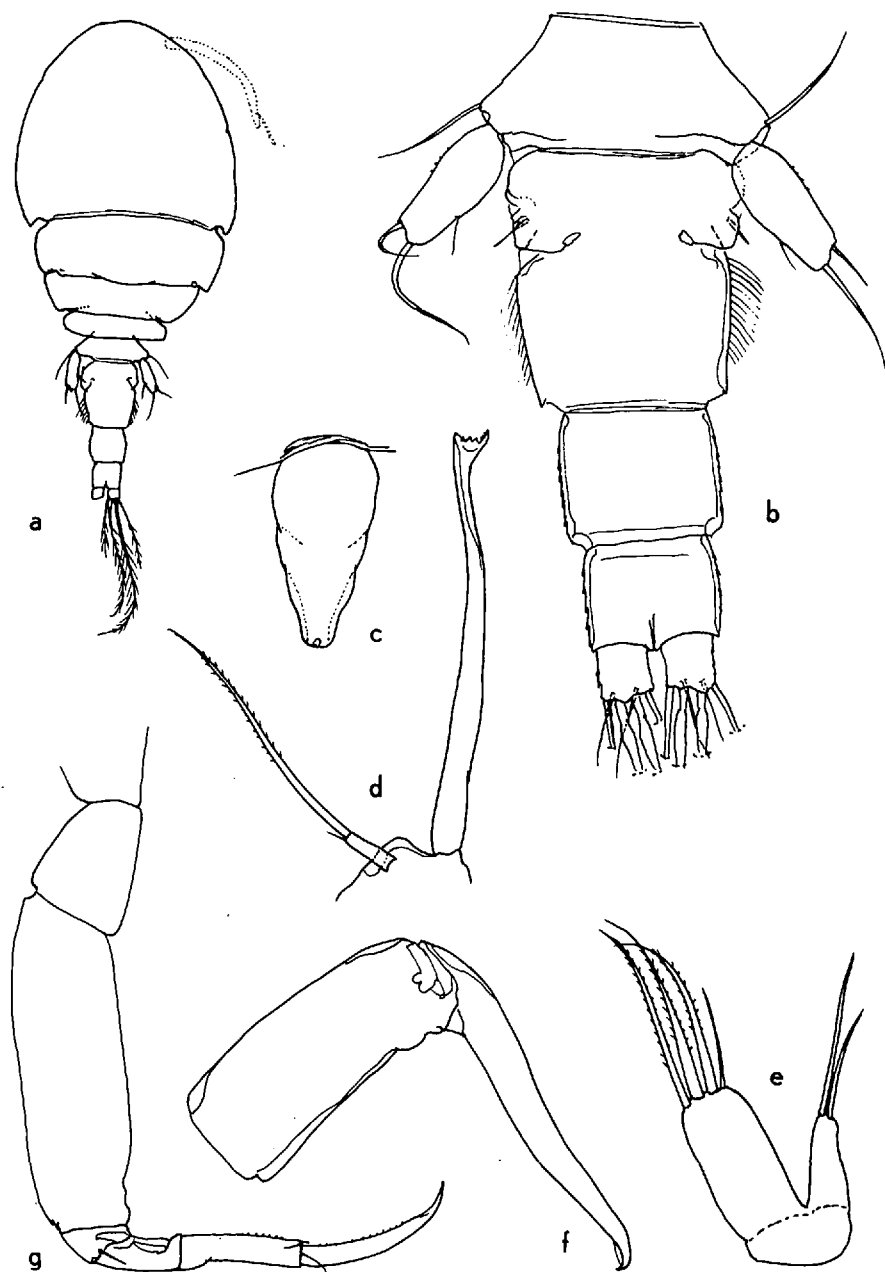


Figure 3. *Asteropontius proximus* new species, ♀: a, body, dorsal (scale AB); b, urosome, ventral (AD); c, proboscis, ventral (AC); d, mandible (AE); e, first maxilla (AE); f, second maxilla (AE); g, maxilliped (AE). Scales on Figure 5.

*Male*.—Unknown.

*Etymology*.—The proposed specific name, *proximus* (Latin, =nearby) alludes to the close similarity to *A. longipalpus*.

*Remarks*.—Five species belong with certainty to *Asteropontius* (Stock, 1975a).

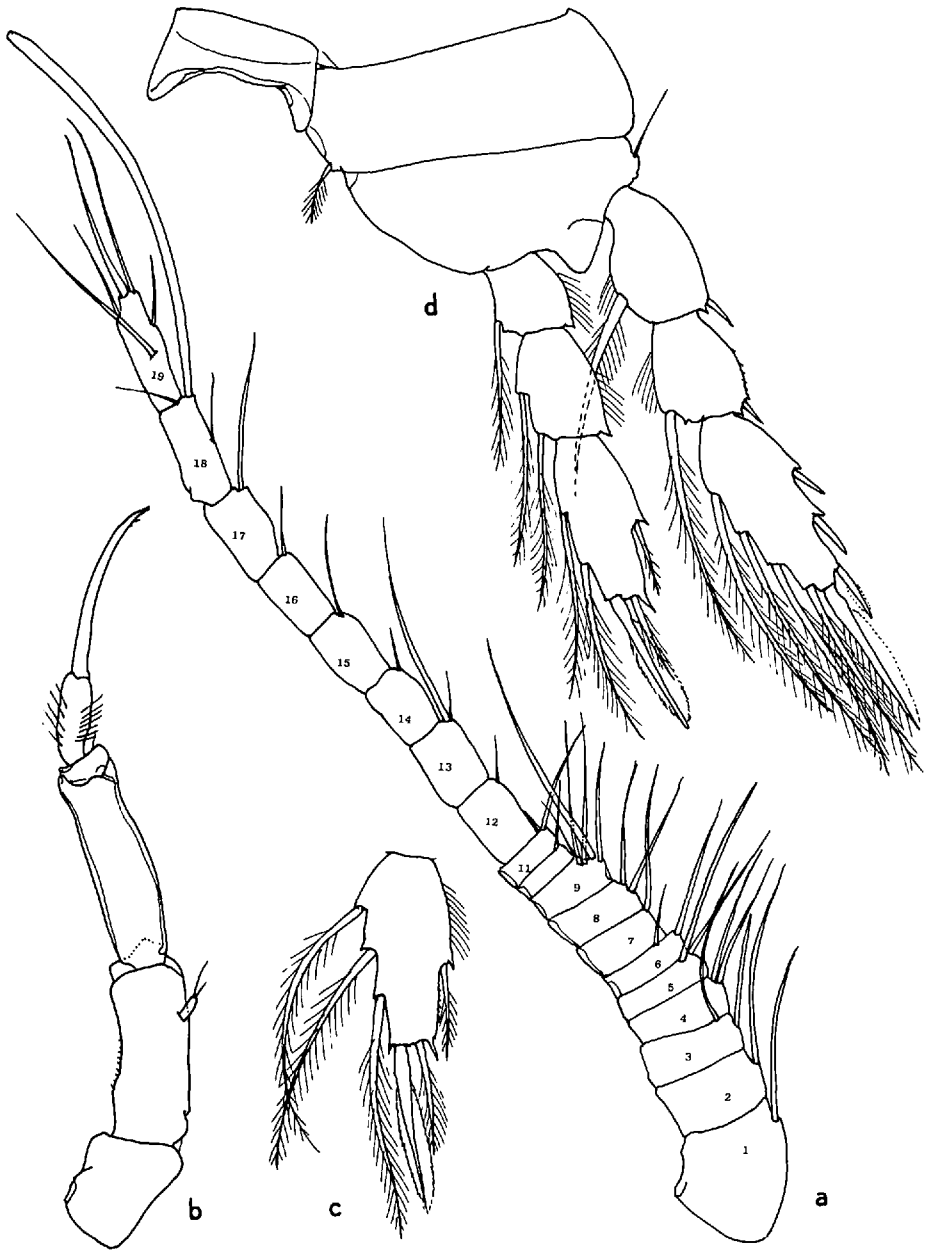


Figure 4. *Asteropontius proximus* new species, ♀: a, first antenna; b, second antenna; c, third endopodite segment of third leg; d, fourth leg. All scale AE. Scale on Figure 5.

Two of these, *A. ungellatus* Stock, 1975 and *A. parvipalpus* Stock, 1975, have a strongly reduced mandible palp (basal segment absent or short, distal seta much shorter than mandibular stylet).

The new species agrees with the other three species (*A. typicus* Thompson and Scott, 1903, *A. corallophilus* Stock, 1966, and *A. longipalpus* Stock, 1975), in

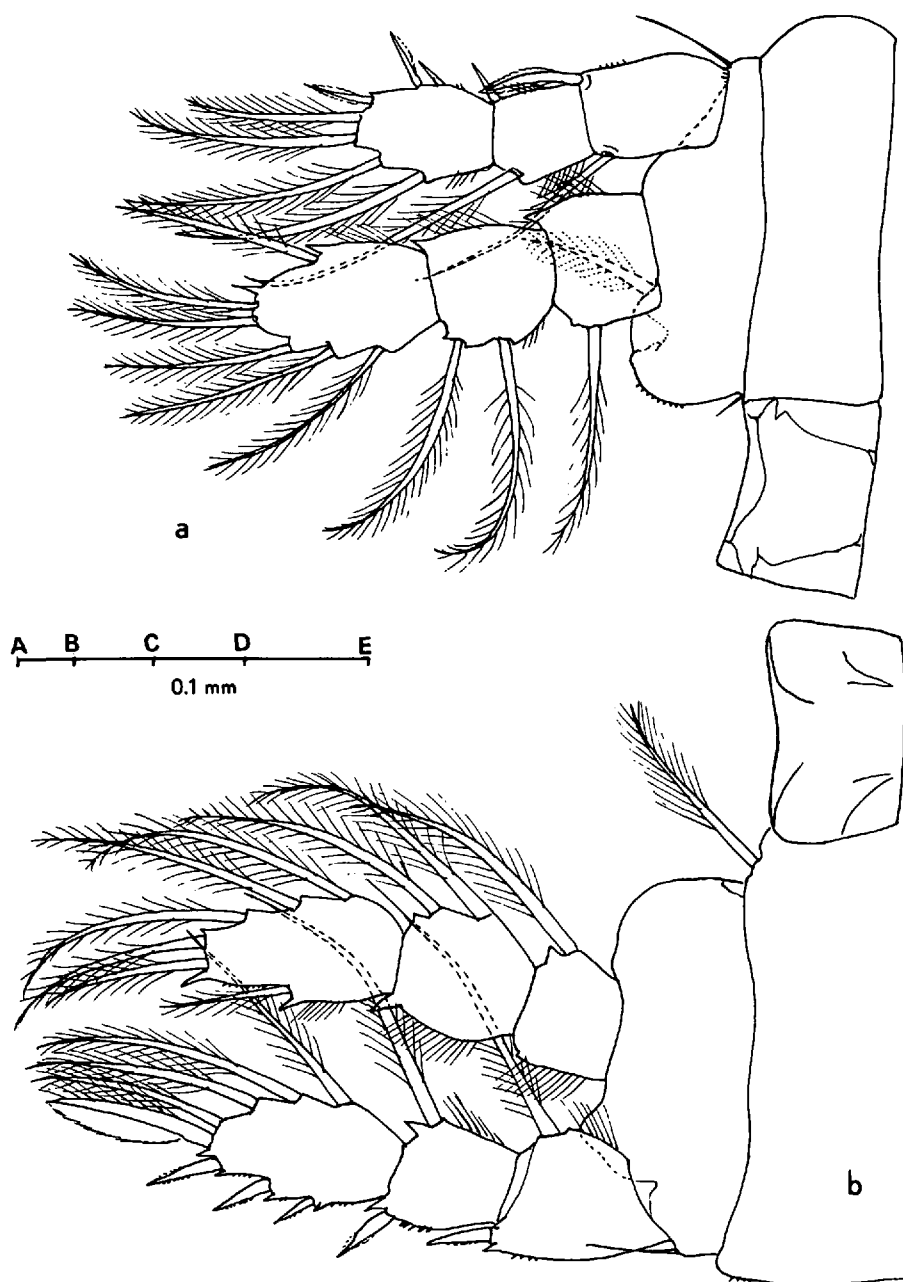


Figure 5. *Asteropontius proximus* new species, ♀: a, first leg; b, second leg. Both scale AE. Each scale unit (AB, AC . . . AE) represents 100 μm.

possessing a mandibular palp with a long distal seta that reaches almost the end of the mandibular stylet.

*A. typicus* and *A. corallophilus* (both from the Indian Ocean) differ from the new species in the following respects: (1) The free segment of P5♀ does not reach the genital apertures; (2) this segment is less elongate in shape; (3) the medial

coxopodite seta of P1 is more strongly developed and plumose; (4) the 3rd endopodite segment of P1 is more rounded in shape; (5) P5 has all three setae arranged in (sub)terminal position; (6) the outer lobe of maxilla 2 bears 3 (instead of 2) setae and is less than half as long as the inner lobe.

The Caribbean *A. longipalpus*, associated with the Corallomorpharian *Ricordea florida*, is closest to the new species. It differs in (1) the presence of 3 setae (instead of 2) on the outer lobe of maxilla 1; (2) longer spiniform processes on the 3rd endopodite segment of P1; (3) a longer medial seta on the coxopodite of P1; (4) a greater body length (1.1–1.2 mm versus 0.82–0.88 mm); (5) a more distal implantation of the medial seta of P5.

### *Asteropontopsis* new genus

**Diagnosis.**—Resembling *Asteropontius* Thompson and Scott, 1903, but for the armature of the first exopodite segment of P1 (I-0, instead of I-1), and that of the third exopodite of P4 (II-I-4, instead of III-I-4). Proboscis distally with 2 hyaline lobes.

**Type Species.**—*A. faviae* new species.

**Remarks.**—The differences between *Asteropontius* and *Asteropontopsis* are slight, but of the same magnitude used to distinguish various genera in the family Lichomolgidae (Humes and Stock, 1973). Moreover, the six known species of *Asteropontius* are morphologically so uniform that it is considered justified to create a new genus for the parasites of the coral *Favia*.

**Material.**—All from *Favia fragum* (Esper), Curaçao: 1 ♀ (holotype), 1 ♂ (allotype), 4 ♀ (paratypes), endoparasitic in the polyps of the coral. East side Piscadera Bay, depth 1–1.5 m, Jan. 1974 (ZMA Co. 102.736). These 6 specimens were isolated from 23 colonies of the host examined. 9 ♀ (paratypes). Same locality, depth ca. 0.5 m, 18 March 1974 (ZMA Co. 102.738). 7 ♀. Jan Thiel Bay, W side, near entrance of small lagoon, depth ca. 0.2 m, 30 March 1974 (ZMA Co. 102.739). 1 ♀ ca. 500 m W of Piscadera Bay, depth ca. 4 m, 16 Jan. 1974 (ZMA Co. 102.737).

**Female.**—Body length 0.79–0.87 mm, greatest width 0.43–0.44 mm. Body shape (Fig. 6a) similar to that of species in the genus *Asteropontius*. Genital segment (Fig. 6b) slightly wider than long, posterior half with ciliated lateral margins. Two post-genital segments, slightly wider than long, unadorned. Furcal ramus (Fig. 6b)  $30 \times 22 \mu\text{m}$ ; furcal setae not plumose.

First antenna (Fig. 7a) 19-segmented. Segments 1 to 8 each with 2 setae; segment 9 with 7 setae; segments 10 and 12 through 17 with 2 setae; segment 11 with 1 seta and 1 strong spine; segment 18 with 1 seta and 1 robust, long, distal aesthetask; segment 19 with 7 setae.

Second antenna (Fig. 7c): Coxopodite with 1 distal spinule. Basipodite unarmed. Exopodite small, 1-segmented, with 2 distal and 1 medial setule. Endopodite 3-segmented; segment 1 the longest, unarmed; segment 2 small, wedge-shaped, armed with 1 medial spinule; segment 3 with 1 distomedial spine and a proximolateral, horseshoe-shaped patch of setules. Terminal element claw-like, curved, with 2 minute subdistal teeth.

Proboscis (Fig. 6d) short, pear-shaped, without tubiform distal part; distally 2 membranous lobes are present.

Mandible (Fig. 6e) with slightly bent stylet, distally widened into toothed cutting blade; palp 1-segmented, digitiform segment with 1 robust, long, distal seta.

First maxilla (Fig. 7d): Outer lobe narrow, short, with 3 long and 1 short setae. Inner lobe wide, with 4 strong distal setae.

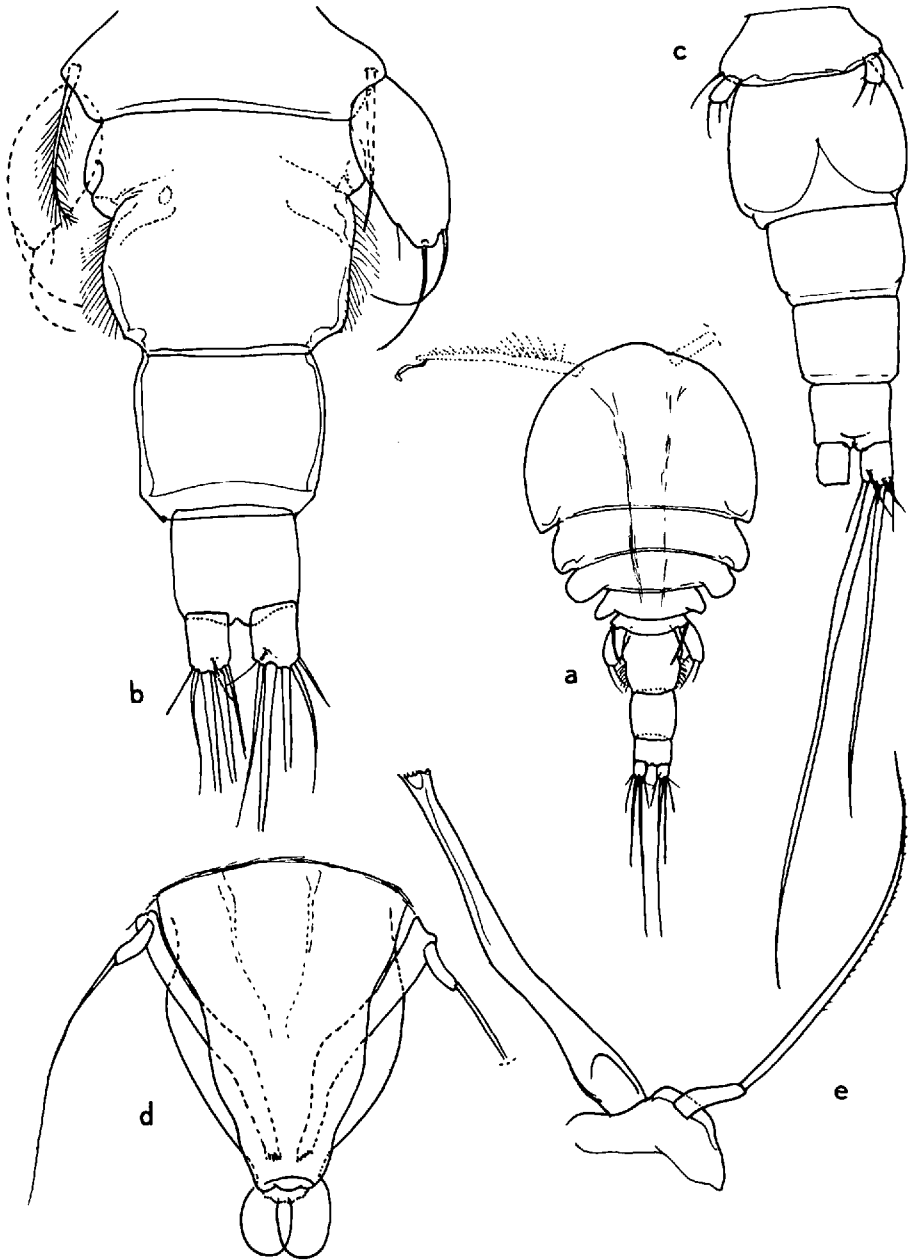


Figure 6. *Asteropontopsis faviae* new genus, new species: a, female, dorsal (scale AB); b, urosome, ♀, ventral (AD); c, urosome, ♂, dorsal (AD); d, proboscis and mandibles, ♂, ventral (AE); e, mandible, ♀ (AE). Scales on Figure 5.

Second maxilla (Fig. 7e) with unarmed basal segment and curved claw; tip of claw recurved, with 1 small subdistal tooth.

Maxilliped (Fig. 8b): First segment with 1 minute inner spinule. Second segment largest, unarmed. Third segment with 2 distal spinules, fourth unarmed, fifth with 1 distal seta, sixth curved, with 2 small subdistal teeth.

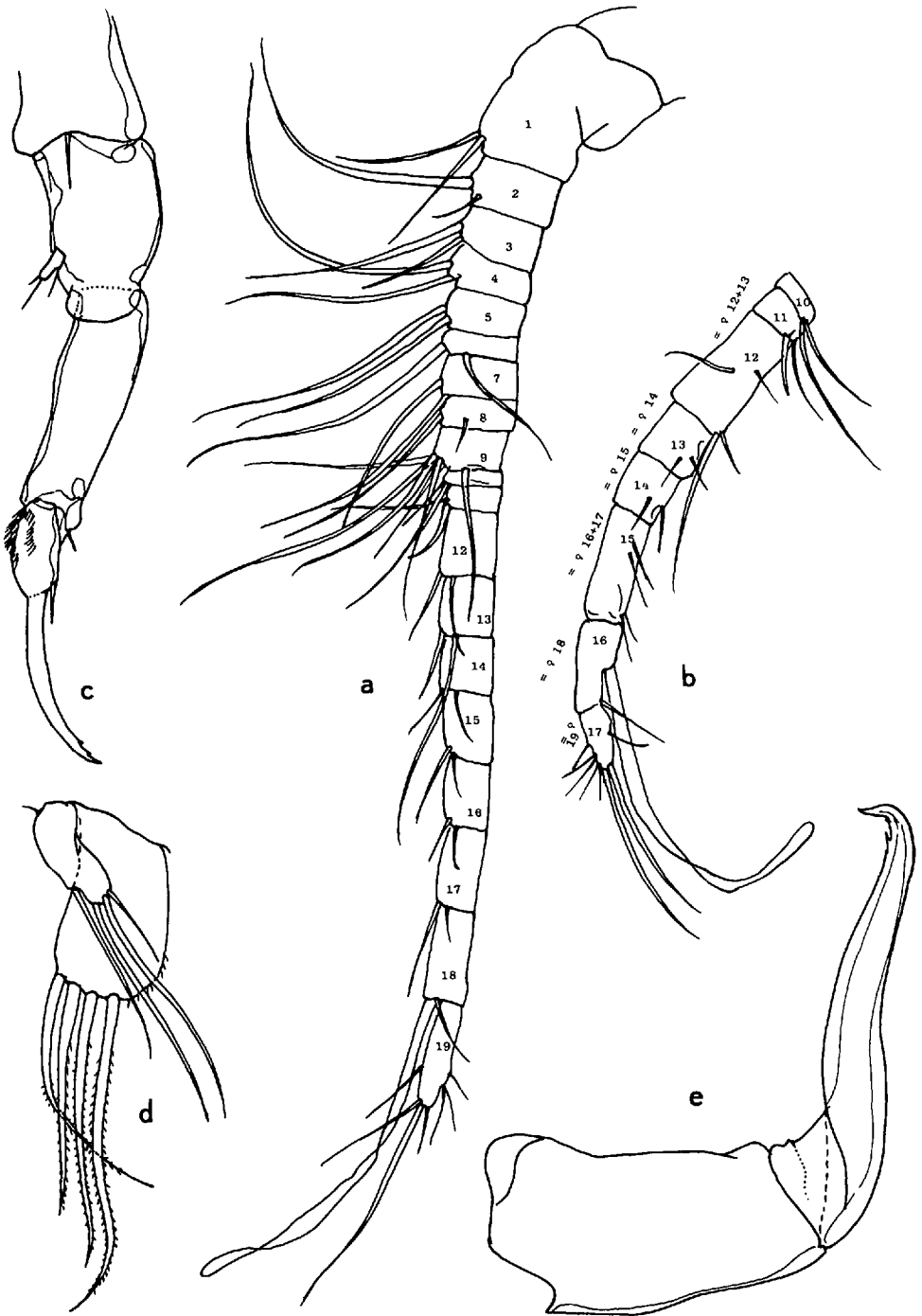


Figure 7. *Asteropontopsis faviae* new genus, new species: a, first antenna, ♀; b, distal part of first antenna, ♀; c, second antenna, ♀; d, first maxilla, ♀; e, second maxilla, ♀. All scale AE. Scale on Figure 5.

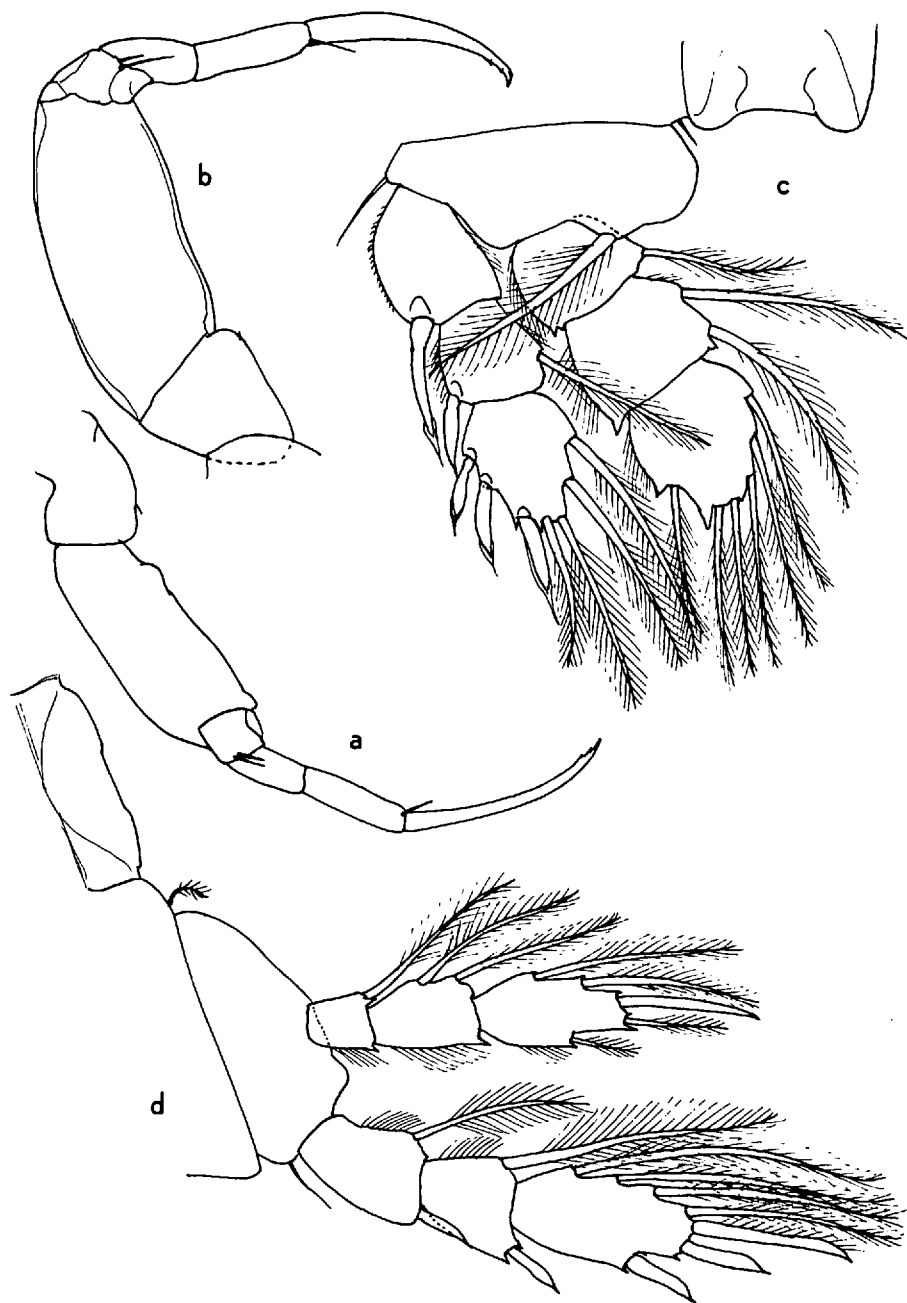


Figure 8. *Asteropontopsis faviae* new genus, new species: a, maxilliped, ♂; b, maxilliped, ♀; c, first leg, ♀; d, fourth leg, ♀. All scale AE. Scale on Figure 5.

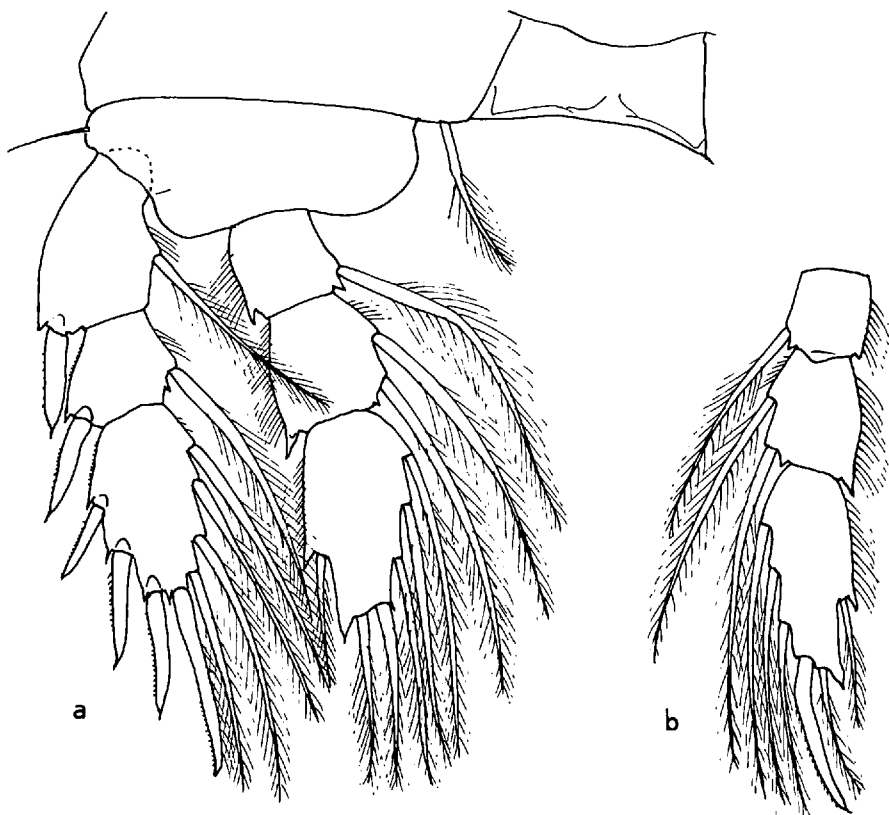


Figure 9. *Asteropontopsis faviae* new genus, new species: a, second leg, ♀; b, endopodite of third leg, ♀, both scale AE. Scale on Figure 5.

Legs 1 to 4 (Figs. 8c–d, 9a–b) biramous, each ramus 3-segmented. Medial coxopodal seta very short in P1, long and plumose in P2 and P3, short and plumose in P4. Lateral basipodal seta rather short and naked in P1 to P4. Lateral exopodite spines characteristically shaped: basal part more or less sausage-shaped, distally provided with hyaline point.

Chaetotaxis formula:

|    | coxopodite | basipodite | exopodite         | endopodite        |
|----|------------|------------|-------------------|-------------------|
| P1 | 0-1        | 1-1        | I-0; I-1; III-2-2 | 0-1; 0-2; 1-2-3   |
| P2 | 0-1        | 1-0        | I-1; I-1; III-1-4 | 0-1; 0-2; 1-2-3   |
| P3 | 0-1        | 1-0        | I-1; I-1; III-1-4 | 0-1; 0-2; 1-1+I-3 |
| P4 | 0-1        | 1-0        | I-1; I-1; II-1-4  | 0-1; 0-2; 1-1+I-2 |

Fifth leg (Fig. 6b) accompanied by long, plumose seta implanted on first urosomite; free segment ovate,  $72 \times 40 \mu\text{m}$ , with 2 long, naked, (sub)distal setae and a short medial setule.

**Male.**—Body more slender than that of female; length 0.60 mm, greatest width 0.26 mm. Urosome (Fig. 6c) 5-segmented. Furcal ramus  $21.5 \times 15 \mu\text{m}$ , armed as in ♀.

First antenna 17-segmented (female segments 12 and 13 are fused to one segment in male; and female segments 16+17 are homologous with segment 15 of

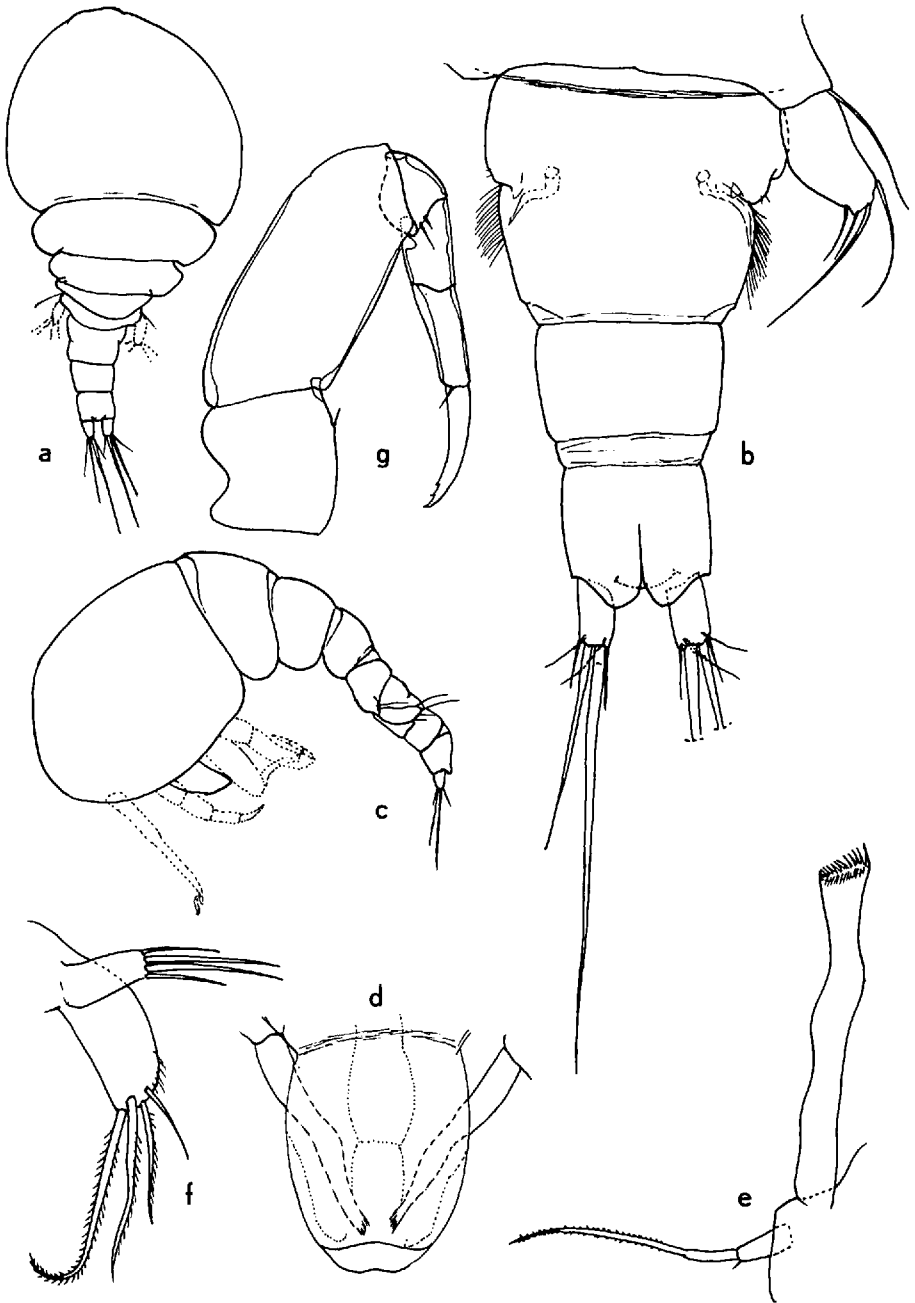


Figure 10. *Hermacheres diploriae* new genus, new species, ♀: a, body, dorsal (scale AB); b, urosome, ventral (AD); c, body, lateral (AB); d, proboscis, ventral (AD); e, mandible (AE); f, first maxilla (AE); g, maxilliped (AE). Scales on Figure 5.

male). Segments 1 through 11 as in ♀. Segment 16 with notch halfway its length in which long aesthetask is implanted (Fig. 7b).

Maxilliped (Fig. 8a) with bud in basal quarter of inner margin of segment 2 (this bud absent in ♀).

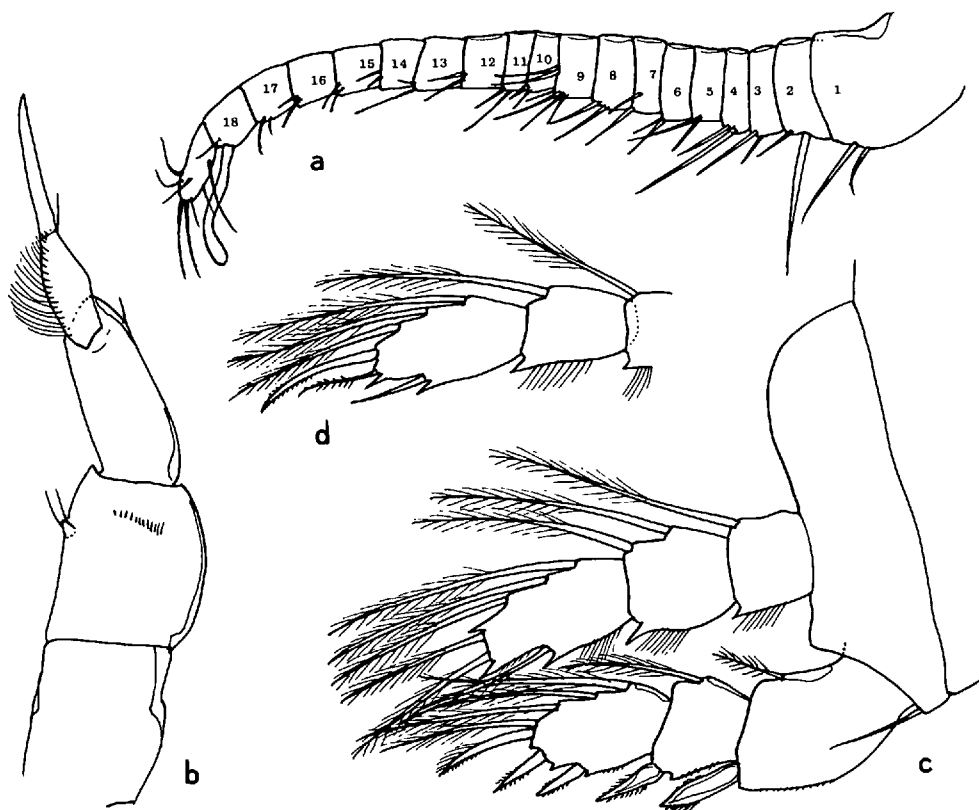


Figure 11. *Hermacheres diploriae* new genus, new species, ♀: a, first antenna; b, second antenna; c, second leg; d, third endopodite segment of third leg. All scale AE. Scale on Fig. 5.

Fifth leg (Fig. 6c) small,  $12 \times 9 \mu\text{m}$ .

Other appendages as in ♀.

**Live Color** (♀).—Body slightly yellowish or orange. Intestine often minium-red. Ovaries white. Eye bright red.

**Etymology**.—The specific name is derived from the generic name of the host.

**Remarks**.—The present taxon, endoparasitic in the polyps of the Antillean coral *Favia*, deviates in three characters from the diagnosis of *Asteropontius* as provided by Stock, 1975c. These differences are mentioned above in the generic diagnosis of *Asteropontopsis*, and all three represent an apomorphous condition as compared with *Asteropontius*.

### *Hermacheres* new genus

**Diagnosis**.—Asterocheridae. Female: Cephalosome and metasome not widened; two postgenital urosomites. P1 to P4 biramous, all rami 3-segmented. P5 well-developed. A1 19-segmented; one aesthetask, on penultimate segment. Exopodite of A2 rudimentary, endopodite ending in strong claw. Proboscis barrel-shaped. Mandible with 1-segmented palp, armed with 1 strong seta; blade distally widened and denticulated. Second endopodite segment of P3 and P4 with 1 medial seta. First exopodite segment of P1 and P4 without medial seta. Third exopodite

segment of P1 to P4 with 2 spines. Armature of third endopodite segment of P4 1-1+I-2. Medial coxopodite setae vestigial or absent.

Endoparasitic in reef corals of the family Faviidae.

*Type Species.*—*Hermacheres diploriae* new species.

*Etymology.*—From the Greek words *ῥεμα* (=reef) and *ἄχνηρος* (=noxious), alluding to its endoparasitic mode of life within hermatypic corals (the suffix *-cheres* being frequently used in this family of copepods).

*Remarks.*—Not unlike *Scottocheres* Giesbrecht, 1897, but characterized by several apomorphous reductions in the armature of legs 1 to 4 (see key above), and by the presence of a mandible palp (plesiomorphous character). The above diagnosis is based on the type-species, and on observations on a hitherto undescribed species associated with the coral *Montastraea*.

### *Hermacheres diploriae* new species

*Material.*—1 ♀ (holotype), 16 ♀ (paratypes), endoparasitic in one colony (diameter ca. 30 cm) of *Diploria clivosa* (Ellis and Solander). Curaçao, Jan Thiel Bay, just outside the jetty of the swimming pool, depth 2–3 m, 3 Jan. 1974 (ZMA Co. 102.740).

2 ♀, same host, same locality, 26 Dec. 1973 (ZMA Co. 102.742).

1 ♀, from a small colony (diameter ca. 6 cm) of *Diploria strigosa* (Dana). Curaçao, Piscadera Bay, in front of Caribbean Marine Biological Institute, depth ca. 0.5 m, 15 Dec. 1973 (ZMA Co. 102.743).

3 ♀, same host, Curaçao, Santa Marta Bay, in front of Coral Cliff Hotel, depth 5–6 m, 16 Dec. 1973 (ZMA Co. 102.741).

*Female.*—Body segments (Fig. 10a) telescoping, hence body length variable: 0.75–0.96 mm; greatest width of cephalosome 0.44–0.51 mm. Body often somewhat curved (Fig. 10c). Lateral margin of genital segment (Fig. 10b) ciliated in posterior half. Other urosomites unadorned. Caudal ramus longer than wide ( $30 \times 20 \mu\text{m}$ ), half as long as anal segment.

First antenna (Fig. 11a) 19-segmented. Segments 1 to 8 each with 2 setae; segment 9 with 6 setae; segment 10 with 1 spine and 1 setule; segments 11 to 17 with 2 setae; segment 18 with 1 setule and a short, robust aesthetascope; segment 19 with 8 setae.

Second antenna (Fig. 11b): Coxopodite unarmed. Basipodite with a row of spinules. Exopodite reduced to a bud armed with 2 setules. Endopodite segment 1 with 1 distal setule; segment 2 with 1 distal setule and a row of cilia on lateral margin. Terminal element almost straight, clawlike.

Proboscis (Fig. 10d) barrel-shaped, without tubiform distal part.

Mandible (Fig. 10e): Unimerous palp with 1 robust seta and 1 minute setule. Stylet shortish, rather wide, sinuous; distally widened into toothed blade.

First maxilla (Fig. 10f): Outer lobe shorter and narrower than inner lobe; each lobe with 4 setae.

Second maxilla (Fig. 12a) robust, basal segment unarmed, claw with subdistal spine.

Maxilliped (Fig. 10g): Basal segment with 1 small, medial spinule. Second segment unarmed.

Leg 1 (Fig. 12b): Exopodite segments 1 and 3 with stout, spinule-tipped spines; segment 2 with very small lateral spine and short medial seta; no medial seta on segment 1. Endopodite segment 2 with 2 medial setae (rarely with 1). Basipodite with plumose medial seta.

Leg 2 (Fig. 11c): First exopodite segment with short medial seta. Second endopodite segment with 2 plumose setae on medial margin. No medial coxopodite seta.

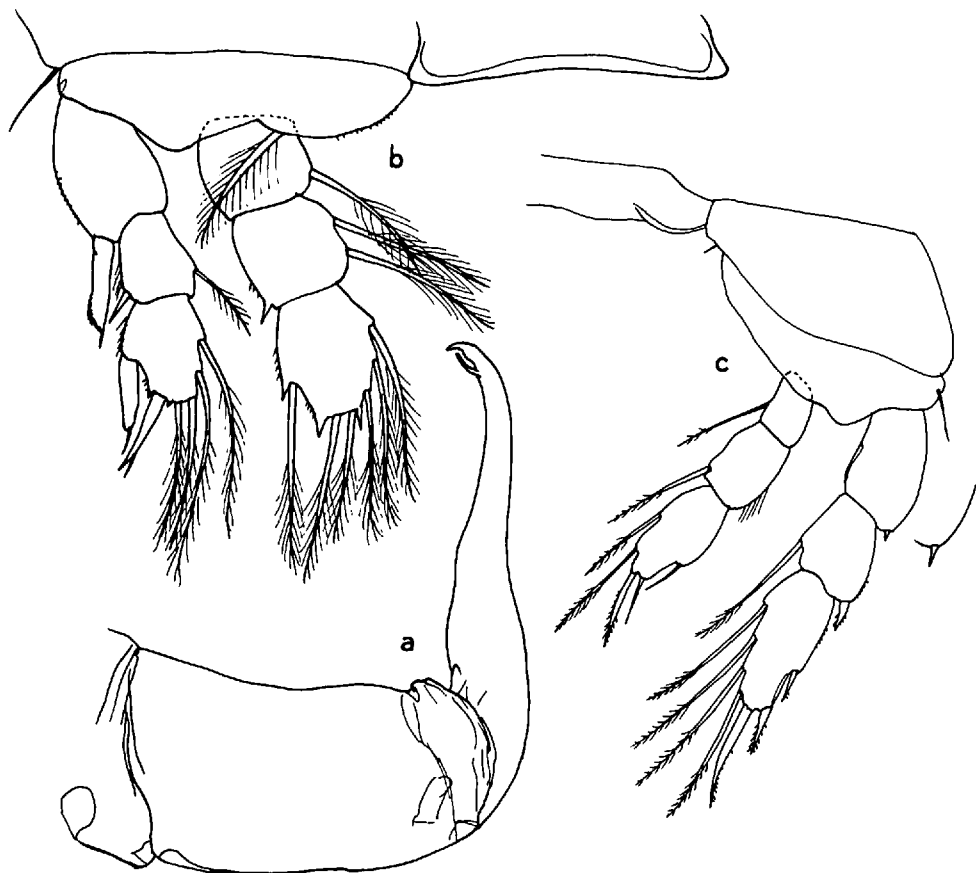


Figure 12. *Hermacheres diploriae* new genus, new species, ♀: a, second maxilla; b, first leg; c, fourth leg. All scale AE. Scales on Figure 5.

Leg 3 (Fig. 11d): Exopodite as in P2. Endopodite segment 2 with only 1 medial seta; segment 3 with distal spine instead of seta; two lateral setae reduced in length.

Leg 4 (Fig. 12c) smaller than P1 to P3, endopodite in particular. Exopodite segment 1 with rudimentary lateral spine. Endopodite setae and spines reduced in length. Medial coxopodite seta vestigial.

Chaetotaxis formula of legs 1 to 4:

|    | coxopodite | basipodite | exopodite          | endopodite        |
|----|------------|------------|--------------------|-------------------|
| P1 | 0-0        | I-1        | I-0; I-1; II-1-3   | 0-1; 0-1; 1-2-3   |
| P2 | 0-0        | I-0        | I-1; I-1; II-1-4   | 0-1; 0-2; 1-2-3   |
| P3 | 0-0        | I-0        | I-1; I-1; II-1-4   | 0-1; 0-1; 1-1+1-3 |
| P4 | 0-(1)      | I-0        | (I)-0; I-1; II-I-4 | 0-1; 0-1; 1-1+I-2 |

Leg 5 (Fig. 10b) rather large and wide ( $65 \times 35 \mu\text{m}$ ); two long (latero) distal setae and 2 short (medio)distal setae.

*Male*.—Unknown.

*Live Color*.—Opaque white; intestine yellowish; eye red; ovaries yellowish to greenish.

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